

volume, while the value of accurate photographs of animals as a means of instruction in natural history is noticed in the concluding paragraphs of the introduction.

Possibly, and if so pardonably, the author is inclined to over-rate the importance of photographic illustrations in zoological work. In many respects, such as representing birds in their natural surroundings, its importance cannot, indeed, be over-estimated. But when the author goes on to deride the work of the pencil of the artist as a means of illustrating books on natural history, and to declare that the wood-cut and the "process-block" are things of the past in this connection, we take leave to differ from such a sweeping assertion. Nor are we alone in so doing, for Mr. W. T. Hornaday, in his recently issued "*American Natural History*," takes occasion to point out that photography has its limitations in the portrayal of animals, and that some illustrations demand the artist's pencil in order to become satisfactory zoological portraits. It is quite true, as Mr. Brownell urges, that the sketch, as compared with the photograph, may be crude and unfaithful to nature, yet it will nevertheless often accentuate or display essential features which are scarcely perceptible or absolutely hidden in the sun-portrait.

With this reservation, we are absolutely at one with the author in regard to the extreme importance and value of photography in natural history work, and, like him, we look forward to the time when real colour-photography will have been discovered and made available for everyday use. After describing in full detail the general technique of the photographic art and the kinds of camera and other apparatus best suited to the outdoor photographer of animal life, the author proceeds to discuss the mode of procedure in the case of different subjects, devoting one chapter to the larger mammals, another to the small mammals, a third to birds, and so on. So far as we can judge, all his advice is to the point, and the illustrations given as samples are in most cases admirable animal portraits. Not that attention is confined to animated nature, for we have a chapter on plant-photography, and another on the use of the camera in depicting sporting scenes and incidents, each as charmingly illustrated as their predecessors. Above all, the book is by no means dry reading, the technical details being enlivened with numerous and appropriate anecdotes. Mr. Brownell has, in fact, succeeded in producing a treatise on practical field-photography which it will be very hard to beat.

R. L.

A POPULAR STAR ATLAS.

Popular Star Maps. A Rapid and Easy Method of Finding the Principal Stars. By Comte de Miremont, F.R.A.S. (London: George Philip and Son, Ltd., 1904.) Price 10s. 6d. net.

IT is by no means an easy task to construct a series of charts of the principal stars in the sky that will at once be of service to those wishing to

make themselves familiar with the chief constellations or star groupings. Many, if not the majority, of star atlases printed for beginners are so belaboured with lines indicating right ascensions and declinations, names of constellations, Greek letters or numbers against each star, different notations for variable stars, &c., that when the beginner turns his eyes from the starry heavens towards a chart in order to find out the particular grouping in question he is unable to recognise it among the innumerable markings. For this reason many who have made valiant attempts to learn the stars have given up trying, and it is the atlases that are to blame and not the seekers after knowledge.

The ideal set of charts for a beginner should in the first place represent the appearance of the starry heavens as near as possible, and consist of maps showing small white discs or stars on a dark background the discs or stars varying in size according to the magnitude of the star; secondly, a fairly large region should be included in each map; thirdly, only stars to the third or fourth magnitude should be inserted; and lastly, each map should have an accompanying duplicate chart or key-map on the same scale, but with dark discs or stars on a white background, on which as much information as may be useful should be given.

In this way the beginner can at once find his particular stars on the first map, and learn their names, &c., on the accompanying key-map. This seems to be the logical method of aiding those who are not accustomed to deal with star charts, and it is a pleasure to find that such a series of maps is now available for those who wish to take advantage of them.

The charts in question, ten in number, and each accompanied by a key-map, have been prepared by Comte de Miremont, one who is thoroughly acquainted with the stars from the navigating point of view, and is familiar with the desire of sailors and others for a simple star atlas. Stars to the fourth magnitude only are inserted, and these are represented, on charts 10 inches square, as white stars on a dark blue background; in the accompanying but separate key-maps, of the same size, the stars are black on a white background. Great care has been taken to ensure accuracy in the star positions.

The method of projection, namely, the gnomonic, is also one which lends itself well to this type of atlas, for the whole of the celestial sphere can be projected on six plates, each plate thus representing one side of a cube enveloping the sphere. The upper and lower sides of the cube enclose the north and south polar regions respectively, and the other four sides the equatorial regions. To render more clearly the relations to each other of star groups near the edges of each of these equatorial sides in contact, four additional overlapping maps are added. Thus there are ten charts in all, and there is this advantage, that each one with its corresponding key-map can be taken out of the portfolio and used in the observatory, in the field, or on board ship by itself. On each chart and its key is a scale of right ascensions with the seasons of the year when each of the constellations is

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visible in these longitudes; the declinations are omitted from the maps, but this information, and the right ascensions of every star marked, are given in the table showing the mean places (and annual change) for January, 1904. Other lists include the names of the constellations and the principal stars in each, and a complete alphabetical list of stars in the maps.

With regard to the general get-up of the maps, letterpress, and portfolio which encloses them, more could not be desired, and great credit is due to both compiler and publisher for producing such a serviceable and handsome set of star charts for the use of beginners, and at such a low price. W. J. S. L.

A CONTRIBUTION TO MUSEUM HISTORY.

The History of the Collections contained in the Natural History Departments of the British Museum. Vol. i. Pp. xvii+442. (London: Printed by Order of the Trustees of the British Museum, 1904.)

EVERY museum of the first rank has two histories, one of which is usually written but rarely published—the history of the gradual accumulation of the museum material, by purchase, exchange, or donation, and another, which can hardly ever be written—the history of the internal metabolism, the arrangement and re-arrangement, the differentiation and integration, the “Kampf der Theile im Organismus.” It may not be difficult to indicate how various museums have adapted themselves to the advance of science and to their growing constituency under the influence of effective directors, how nature has crept in between the teeth of the abstractive scientific fork, how evolutionary series have replaced static taxonomic displays, how problems of practical human interest have been recognised, how a mere chamber of horrors has become an introduction to a rational study of pathological variation, and so on; but who can ever tell the detailed physiological story of the metamorphoses? For the great museum is an organism of many parts, each with its *spiritus rector*, each developing independently, and yet in cooperation with the rest. It may not be difficult to show how a museum has changed or is changing as the various objectives—for instruction, for investigation, for inspiration—have become more clear to the organisers; when, for instance, the simple step is taken of discriminating between what can be usefully exhibited and what should be as usefully concealed; but who can ever tell how much even this simple step costs? Is the price-less connecting link to be shown with blinds up or with blinds down, or not at all? But we must not intrude further into the real history of a great museum; it is an intricate story of thrust and parry between keepers and their environment, both animate and inanimate. The history before us is a history, not of the British Museum (Natural History Departments) as a growing organism; it is the history of the collections—a story of accretion.

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The first volume of the history of the collections preserved in the four natural history departments of the British Museum deals with the botanical, geological, and mineralogical material, and also with the libraries. It has been produced at the suggestion of the director, Prof. E. Ray Lankester, by the officers in charge of the collections. Mr. B. B. Woodward has written the history of the libraries; Mr. George Murray, assisted by Mr. Britten, that of the department of botany; Dr. Arthur Smith Woodward, with valuable help from the late keeper, Dr. Henry Woodward, and from Dr. Bather, assistant keeper, that of the department of geology; and Mr. Fletcher that of the department of minerals. The second volume will deal with the department of zoology.

It need hardly be said that the various histories of the collections are scholarly productions; they tell of the foundation-stones and of the additions made from year to year, and they give an annotated alphabetical list of the numerous benefactors and vendors. The result is not adapted for fireside perusal, but it is very impressive, giving us a correct idea of the variety, extent, and importance of the immense series of collected specimens which are carefully guarded and ordered, “not only” (according to the terms of Sir Hans Sloane’s will) “for the inspection and entertainment of the learned and curious, but for the general use and benefit of the public to all posterity.” And it is also interesting to turn over the leaves and observe how many famous names occur on the honourable lists. Many of the short biographical notes in the geological and mineralogical sections supply valuable historical material. A useful addendum, we think, would have been a series of references to the catalogues and memoirs in which the collected material has been described.

The book will be of great value to investigators who wish to trace collections and specimens, or who wish to know beforehand what to expect in the British Museum; and everyone will agree that it furnishes abundant documentary proof of the carefulness and business-like methods of the great museum, which is one of the national assets that we have most reason to be proud of.

SCIENCE AND METAPHYSICS.

Scientific Fact and Metaphysical Reality. By Robert Brandon Arnold. Pp. xxiii+360. (London: Macmillan and Co., Ltd., 1904.) Price 10s. net.

IF this book does not conform to the adage “*Nonum prematur in annum*”—for Mr. Arnold’s undergraduate career is no distant memory—that is no ground for complaint. The work is not only one of great promise, but a notable performance. In originality of conception, vigour and clearness of statement, width of outlook and fairness to all the aspects of experience, it would be with difficulty surpassed. At the same time it is quite unpretentious; there is no parade of learning; there is not a single foot-note. The one digression of any length—on